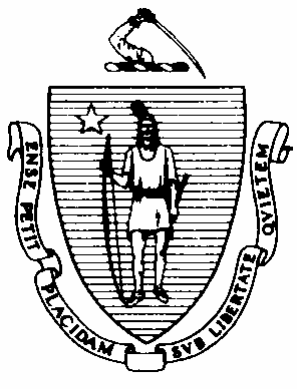

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Prevention and Control of Healthcare-Associated Infections In Massachusetts

Executive Summary: Part 2

convened by the Betsy Lehman Center for Patient Safety and Medical Error Reduction

and

JSI Research and Training Institute, Inc.

in Collaboration with

the Massachusetts Department of Public Health

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EXECUTIVE SUMMARY

The recent healthcare reform law (Chapter 58 of the Acts of 2006, Section 2) directed the Massachusetts Department of Public Health (DPH) Division of Health Care Quality to develop a Statewide Infection Prevention and Control Program. JSI Research and Training Institute of Boston was selected by DPH to carry out a number of specific programmatic activities related to this legislation, including convening an Expert Panel. The recommendations of the Expert Panel are described in Part 1 of this report.

To inform the overall process, several related projects were undertaken by JSI and their collaborators. These included:

1. a statewide survey of acute care hospitals to determine their current activities and capacity for participating in additional prevention and/or reporting aspects;
2. focus groups with hospital executives concerning mandatory HAI reporting;
3. formative research with the general public to determine appropriate formats for conveying HAI information;
4. an economic analysis of HAI costs in Massachusetts;
5. a synopsis of literature concerning best practices for educating healthcare workers on prevention of HAIs.

Part 2 of the report contains the detailed information on these aspects. The following are brief highlights of the five sections.

I. FINDINGS FROM THE STATEWIDE SURVEY OF HOSPITALS ON HAI PREVENTION AND CONTROL ACTIVITIES

In order to understand the current approaches and "best practices" for HAI surveillance, prevention, reporting and education in Massachusetts and assess capacity for reporting activities, JSI surveyed the Infection Control Directors of 71 acute care general hospitals in February 2007 and 68 (96%) responded. The results indicated that infection control programs in the state are extremely active in a wide range of activities related to blood stream infections, surgical site infections, ventilator associated pneumonia, methicillin-resistant *Staphylococcus aureus*, and other pathogens.

Percent of 68 Massachusetts hospitals involved in surveillance and prevention of specific HAIs

HAI	Ongoing Surveillance	Prevention Activities
Blood Stream Infections	100%	91%
Surgical Site Infections	100%	97%
Ventilator Associated Pneumonias	96%	96%
Catheter-Associated UTIs	59%	Not asked
MRSA	100%	100%
Influenza	91%	100%
Clostridium difficile	93%	96%

Although surveillance is done across all hospitals, the ability to calculate HAI-specific rates is problematic because of challenges in identifying and quantifying populations at risk. All of the hospitals are involved in the federally-required Centers for Medicare & Medicaid Services (CMS) programs, and many also take part in other multi-institution efforts to prevent HAIs, including the IHI 100,000 Lives Campaign, Leapfrog, and Patients First.

Prevention activities include strategies to reduce CVC-BSIs, consistent and timely antibiotic prophylaxis for surgery, and isolation of patients who are positive for MRSA. Hospitals are also very active in general preventive practices, with all hospitals involved in efforts to improve hand hygiene adherence and decrease risk of infection through contact precautions. Most hospitals commonly evaluate the adherence to these efforts and the effect of prevention activities on HAI rates. While a majority has also identified barriers to adherence to their activities, there was a wide range of educational and other interventions being conducted to improve effectiveness and increase performance.

Overall, infection control program staff is involved in a large number of activities directly related to HAI surveillance, prevention, control, and reporting. Some HAI-related activities are being performed by other groups in the hospitals (e.g., quality improvement personnel and ICU staff) and the extent of coordination with the infection control program appears to vary among facilities. The demands on infection control professionals are also increasing, with significant time spent on a wide range of other activities including quality assurance, data management, staff education, occupational health, emergency preparedness, and environmental issues. There is an average of one Infection Control Professional (ICP) full-time equivalent (FTE) per 178 hospital beds -– a somewhat lower ratio than current national recommendations. Less than sixty percent of ICPs stated that the resources for infection control activities in their hospital are adequate even though the perceived rating of institutional support for infection control program activities is high.

II. FINDINGS FROM FOCUS GROUPS WITH HOSPITAL EXECUTIVES ON PUBLIC REPORTING OF HAIs

To ensure a thoughtful and systematic study of issues relating to public reporting of healthcare associated infection (HAI) rates, JSI solicited the opinions of hospital executives on this subject by conducting focus groups with hospital leaders. The objectives of the focus groups were to understand senior hospital leadership's perspective on:

- the anticipated mandatory public reporting of hospital-specific HAIs to be implemented by Massachusetts Department of Health (MDPH), including their perceptions of potential benefits, potential costs, and barriers to implementation.
- how public reporting would affect their hospital's operations, its infection control program and its relationships with other key stakeholders such as insurers, accrediting bodies, clinical staff, and patients.

Focus group participants were recruited with assistance from the Massachusetts Hospital Association (MHA). Eleven senior hospital leaders were recruited, including chief quality improvement officers, chief operating officers, and chief medical officers. The six hospitals represented were located in various parts of the state, and included academic medical centers and community hospitals, large and small institutions, as well as single facilities and hospital systems.

Three focus groups were held in May 2007 by conference call. Discussions focused on a broad range of potential consequences and impacts of publicly reporting HAI rates. Unfair or inaccurate comparison of rates across hospitals proved to be the most common concern. Senior hospital leadership repeatedly underlined the need to account for variability in the risk of acquiring HAIs across patient populations (risk-adjustment) when comparing hospitals. They want the system to compare "apples to apples" and to ensure that the public understands the information being reported.

There was agreement that the reaction of the public to the anticipated HAI reports would depend largely on how these data were presented. Some hospital executives feared that small differences between individual hospital rates that are not statistically and clinically meaningful would be misinterpreted by the public. Others believed that the public would not be interested in the information, given that there is no current evidence that the general public uses the available hospital quality data. Hospital executives emphasized the need to educate the public on the meaning and implications of the reported information owing to the complexity of the data. Also stressed was the need to report these data in real time in order to avoid reporting outdated

numbers. Participants also warned against creating a "punitive" system, saying that optimal reporting will occur in a blameless environment.

The issue of additional resources required by a public reporting system was also raised. Hospital leadership maintained that the extent of required resources would depend on the measures selected and how these would be reported. Participants expressed a willingness to commit resources to HAI reporting with the understanding that this will be easier if the new HAI system is comparable with other current reporting mandates.

It was made clear by all focus group participants that the impact on hospitals of a new HAI reporting system will greatly depend on the specific requirements. How it will affect their hospital's operations, its infection control program, and its relationships with other key stakeholders will depend on exactly what will be mandated. Hospital executives urged Massachusetts to align with current federal programs such as Medicare in order to avoid resources being diverted away from prevention activities to reporting tasks.

III. FINDINGS FROM THE FORMATIVE RESEARCH WITH THE GENERAL PUBLIC ON HAI INFORMATION

A communications researcher from the University of Massachusetts Medical School (Dr. Kathy Mazor) has been assessing the public's views on HAIs and testing concepts and approaches to conveying HAI information to the general public, with the overall goal of preventing misconceptions. After reviewing the literature and collecting existing reports, they generated sample reports for use in exploratory interviews. These sample reports incorporated specific formatting and data components found in the actual reports, but also incorporated intentional variations to explore the impact of specific variables.

Twenty-two local residents were recruited for 1 hour interviews. Researchers used cognitive interviewing to uncover residents' knowledge about HAIs and to solicit overall responses to the sample reports, as well as targeted interview questions (e.g., "Would this information effect your decision to go to a hospital?" "Which variable is most important to you? Why?", etc.) Participants also rated the reports in terms of information value and understandability. The sample reports were revised iteratively over the course of the 22 interviews, incorporating participants' feedback.

Preliminary findings of the interviews have identified the following themes:

- Many people find the concept of HAIs frightening.

- Some people believe they would refer to a report in selecting which hospital to go to but past experiences at a particular hospital and getting recommendations from friends and family also has a major influence on which hospital is selected.
- Many people admitted that they would not care about the information given in a report unless it was directly and immediately relevant to them (e.g. they were sick or needed surgery or frequently visited a hospital for some reason).
- The majority of people are most concerned with infection rate, mortality rate and safe practice score. Cost and length of stay are much less important and many people were confused about these variables.
- A single summary score may be helpful– many people had difficulty making sense of multiple scores, especially if the rankings of the hospitals varied across the measures reported.
- A number of the variables included in some of the actual reports are difficult for people to understand; brief definitions of each measure are needed.
- For reporting, numbers are preferred over summary symbols (e.g., stars, circles, arrows).
- Some people prefer graphs, but graphs must be simple. Colorful graphs were confusing and distracting to many.
- In reports, hospitals should be ordered according to whatever variable is being reported (e.g. from worst to best rather than alphabetically).
- Emphasis was placed on the brevity of a report with people citing limited time and hectic schedules as reasons for not reading reports.

Based on the findings from the interviews, improved report templates have been developed for further testing. A random sample of Worcester residents was sent a sample report and a questionnaire relating to that report; 197 people responded. Analysis is ongoing, but an interesting preliminary finding is that a composite "safe practice score" may be more important to the public than other outcomes.

The improved templates were also reviewed by 13 local residents in qualitative interviews. It appears that people are happy with the length of the 4 page report and recommend that it not exceed this length. Providing a definition of HAI, on the front cover of the report, and offering suggestions of what one might do to prevent infection on the back cover, were also seen as helpful. In fact, many residents asserted that this information would be more important to them than actual statistics on hospital's infection rate, mortality rate, etc.

Overall, people were confused about statistical elements (e.g., confidence intervals and risk adjustment). Even with a simplified definition of risk adjustment, the majority of people

interviewed could not explain in their own words what risk adjustment was. However, when the interviewer offered an alternative definition (it was a way of providing a level playing field), the concept was better understood, implying that simple wording and perhaps analogies should be used to convey the idea of risk adjustment.

In terms of data interpretation, residents were able to identify the best hospital in each category (safe practice score, mortality rate, and infection rate), but often had trouble selecting the best "overall" hospital if hospitals would be ranked differently on the measures. This further underscores the finding from the first round of interviews that a summary score or paragraph offering comprehensive interpretation of the data may be useful.

In sum, knowledge about healthcare associated infections and ways to prevent them appeared to be more important to people than specific hospital data, brevity of the report was critical, and difficult concepts such as confidence intervals and risk adjustment should either not be included in a report or simplified even further.

IV. ECONOMIC ANALYSIS OF HAIs IN MASSACHUSETTS

Dr. Patricia Stone of Columbia University provided a comprehensive analysis to estimate the current economic burden of HAI in acute care hospitals in Massachusetts and discuss cost issues related to infection prevention, surveillance and mandatory reporting. A comprehensive review of scientific literature and data from a private company provided cost estimates of various HAIs. Broad ranges in estimates are found in the literature, and so both low and high estimates were used to develop a range of HAI costs. Rates of HAIs were based on published rates from a national sample of hospitals participating in the CDC NHSN HAI surveillance program. For total annual HAI costs, the low estimates from both cost sources and the high estimate from the private data company were approximately $200 million ($180, $227 and $233 million); with a high cost estimate from the literature of over $473 million.

Surgical site infections, bloodstream infections, and pneumonia were the three most costly HAIs (Massachusetts annual estimates of $87, $72, and $40 million, respectively), and together accounted for 88% of the annual cost of HAIs. Although urinary tract infections were the most prevalent infections according to national estimates, the associated cost was nine million dollars, or less than four percent of the total HAI cost.

The cost and resource needs for public reporting of HAIs will increase as a result of new demands on hospitals to submit data, but it is not possible to estimate the actual costs at this time. In theory, if infection reporting reduces the incidence of HAI, the resources consumed in these

activities would be offset by savings from the decrease of these costly infections. While there is strong research evidence linking infection surveillance with decreased infections, there is no specific research investigating the impact of mandatory reporting on infection rates and its effect on overall resources and costs is unknown.

While limitations in the available data did not permit a more specific estimate of the costs of HAI, it is clear that these infections represent a significant burden for patients and the health care system. The effect of mandatory reporting on HAI rates is yet unknown. With limited resources and the potential benefits of public reporting yet to be established, there is a need to carefully balance the additional burden of reporting with current prevention efforts in order to obtain the optimum outcome of fewer infections.

V. EDUCATION "BEST PRACTICES" FOR HAI PREVENTION

To evaluate the literature on how to best educate healthcare workers in prevention of HAIs, a consultant expert from World Education was engaged (Beth Gragg). The complete analysis can be found in the full report, but the following are highlights of key findings:

- Education programs alone are not the complete answer to reducing or preventing HAI in hospital settings. They must complement and support structural factors including hospital policies and procedures related to patient safety, evidence-based protocols, the goals and patient safety expectations of management, the safety "climate" or the commitment that management demonstrates to patient safety, and staff workload and turnover.
- Other critical factors are the staff's knowledge about the recommended practice, their perception of the risk of infection to themselves and to the patient, their beliefs about the recommended practice, and their past experiences with HAI. Environmental factors include the resources, equipment and supplies necessary to properly implement recommended practice.
- Successful education programs have utilized a multifaceted approach based on adult learning theory by employing a variety of methods to engage multidisciplinary teams in actively learning about the evidence for recommending changes in practice and specifying clear guidelines. They are targeted toward specific staff that contribute most to the reduction in HAI rates and are delivered in as many ways as feasible so as to reach the greatest number of target staff.
- Involvement of critical stakeholders, including management, in the design and implementation of the programs signals an organizational commitment to the education

intervention and lends credibility to the effort. In addition, providing a strong financial case for implementing educational programs strengthens management's commitment to the effort.

- The effectiveness of hand hygiene campaigns is unclear, although some evidence demonstrates value in increasing compliance for short periods. The difficulty of showing long-term improvement in compliance with hand hygiene may have to do with its general nature. Since it is required in virtually all patient-contact situations, repeated education is needed on a more frequent basis, encompassing a much broader range of personnel. Consequently, it is difficult to pinpoint target messages for specific audiences and to time the delivery of the program so that it makes maximum impact. As opposed to VAP, BSI or SSI control programs, hand hygiene is a less specific preventive measure, which increases the difficulty of motivating consistent changes in practice.
- Design principles for effective staff education programs are specified, including organizational factors, audience factors, training content and modalities, and follow-up approaches.